

RESULTS

All of the information in this section is taken directly from the CFWCS (FWP 2006b), Montana Field Guide (MNHP 2013a; MNHP and FWP 2013a), the SOC list (MNHP and FWP 2013b), and recommendations from the SWAP Technical Teams (personal communications). Any additional citations are identified within each community type or species descriptions.

COMMUNITY TYPES OF GREATEST CONSERVATION NEED

Conservation at the community type level provides the potential to leverage conservation resources to benefit large numbers of species. Community types also provide a way to associate numerous species through common habitat requirements. These communities often face similar conservation concerns that can be addressed simultaneously. The community types in this section have been identified as Tier I CTGCN, and efforts should be made to address the conservation actions identified for these community types across an Ecoregion regardless if they fall within a Focal Area (Appendices J-M). However, the Focal Areas identify geographic areas that offer some of the greatest potential to conserve CTGCN and SGCN.

AQUATIC COMMUNITY TYPES AND CONSERVATION ACTIONS

The ATT identified all streams and rivers as Tier I community types. In addition, 54 lakes and 9 reservoirs were identified as Tier I community types because of their importance in part or all of the life cycle of certain SGCN.

All of the aquatic community types in Montana have similar threats, though the magnitude and urgency of those threats may be different. Likewise, the conservation actions addressing those threats may be different depending on the community type and the geographic area. Threats, impacts and actions are outlined by individual aquatic CTGCN in the following pages. However, a several conservation actions have been developed for all aquatic CTGCN and are identified here.

Broad Actions

Collaboration and outreach

- Actively participate with private landowners, watershed groups, non-governmental organizations, state and federal government agencies, local governments, tribes, landtrusts, conservation districts, and other interested parties to: ensure work plans consider wildlife habitat needs during planning and implementation; ensure effective cooperation; work collaboratively; and promote SGCN and habitat conservation while maintaining private land management objectives.
- Conduct outreach to landowners to implement land management practices that benefit SGCN.
- Continue “angler interviews” to educate anglers on proper fish identification and release methods.

- Continue kids fishing days and “Hooked on Fishing, Not on Drugs” elementary school outreach and education program.
- Continue to disseminate information to the public through annual meetings and press releases.
- Continue to work with FWP lands acquisition personnel.
- Educate individuals on the importance of habitat conservation through one-on-one contacts, attending public meetings, and through various media outlets.
- Educate the public and land managers about the high values of CTGCN and how to better manage these habitats in ways that balance their management objectives with the conservation actions outlined in this SWAP.
- Emphasize native vegetative species growth that is beneficial to SGCN seasonally or year-round.
- Identify programs and funding sources that can provide incentives for landowners to conserve, manage, and/or restore habitat for SGCN; potentially provide appropriate incentives to landowners that cooperate in habitat restoration activities.
- Implement and promote measures to prevent the spread of chytrid fungus (Maxell et al. 2004), whirling disease, and other waterborne diseases during research, monitoring, management, or recreational activities.
- Incorporate other agencies’ Best Management Practices (BMP) when implementing actions outlined in this SWAP.
- Keep the FWP Regional Citizen Advisory Councils informed of SGCN conservation efforts.
- Participate in educational programs to disseminate data and foster advocacy for fisheries resources.
- Provide decision makers with data about pollution impacts on SGCN to help them set water quality standards.
- To avoid spread of aquatic invasive species, follow guidance in *Montana's Aquatic Nuisance Species (ANS) Management Plan* (2002) and updates or revisions to the plan.
- Work closely with landowners and various government agencies on species restoration plans.
- Work with willing landowners and land management agencies on habitat projects using Habitat Montana (FWP 1994), SWG, and other funding sources.
- Work with local communities to maintain family fishing ponds and increase signage to promote native species and habitat protection.

Conservation areas

- Continue to utilize Habitat Montana (FWP 1994) to review potential acquisitions.
- Encourage and support opportunities such as land acquisitions or perpetual easements to conserve CTGCN.
- Prioritize conservation easements and acquisitions adjacent to current conservation investments in order to create contiguous protected habitat that provide habitat linkages across large landscapes.
- When appropriate, designate an area as an important conservation area, natural area, or special botanical area due to the unique qualities and importance of the community type.

- Work with willing landowners, agencies, and organizations to purchase land or acquire conservation easements that support SGCN to: provide access to resources, prevent further habitat fragmentation, and preserve natural habitat function.

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Habitat/species work

- Collect trend data and survey SGCN.
- Encourage erosion control through soil management techniques.
- Gather data with respect to SGIN.
- Encourage and support habitat improvement projects within CTGCN.

Planning and review

- Assist in the review and provide recommendations for habitat work proposals completed by land management agencies that may affect CTGCN.
- Consider SGCN and their habitats during development of management plans for WMAs, Fishing Access Sites (FAS), and state parks.
- Develop management plans for CTGCN to benefit SGCN.
- Follow management direction outlined in the Montana Statewide Fisheries Management Plan (FWP 2013a).
- Review and provide recommendations for federal land management planning processes (e.g., roads, timber, grazing) in CTGCN that may impact the community type and associated SGCN.
- Review proposed private ponds, 310 and 124 projects, and management plans to assure threats to fisheries are minimized.
- Work with other agencies, organizations, and interested parties to promote habitat work to benefit SGCN.

Training and technical assistance

- Provide technical assistance to local landowners, conservation districts, and federal and state agencies as it pertains to the aquatic habitat, function, and fish assemblage.
- Provide technical assistance as needed on issues related to SGCN and their habitats.
- Provide technical assistance to landowners who are considering various conservation easement options on their properties that would benefit the conservation priorities outlined in the SWAP.

Statewide Impacts and Threats

Developments/Subdivisions

- Encourage counties and communities to use the FWP subdivision recommendations.
- Review and comment on subdivision requests that have the potential to impact SGCN and make recommendations based on FWP's *Fish and Wildlife Recommendations for Subdivision Development* (FWP 2012).
- When bridges are installed or replaced, use larger bridge spans to avoid or decrease floodplain constrictions (as opposed to small bridges with filled approaches).

Energy Exploration and Extraction – Including coal, oil, gas, Coal Bed Methane, and bentonite exploration and extraction; construction of pipelines.

- Incorporate recommendations in FWP's *Fish and Wildlife Recommendations for Oil and Gas Development in Montana* (In prep) for energy development projects
- Review and comment on energy related developments on public lands to minimize negative impacts to SGCN and their habitats

Wind Energy

- Incorporate recommendations in FWP's *Fish and Wildlife Recommendations for Wind Energy Development in Montana* (In prep) for energy development projects
- Review and comment on energy related developments on public lands to minimize negative impacts to SGCN and their habitats

Intermountain Valley Rivers and Streams

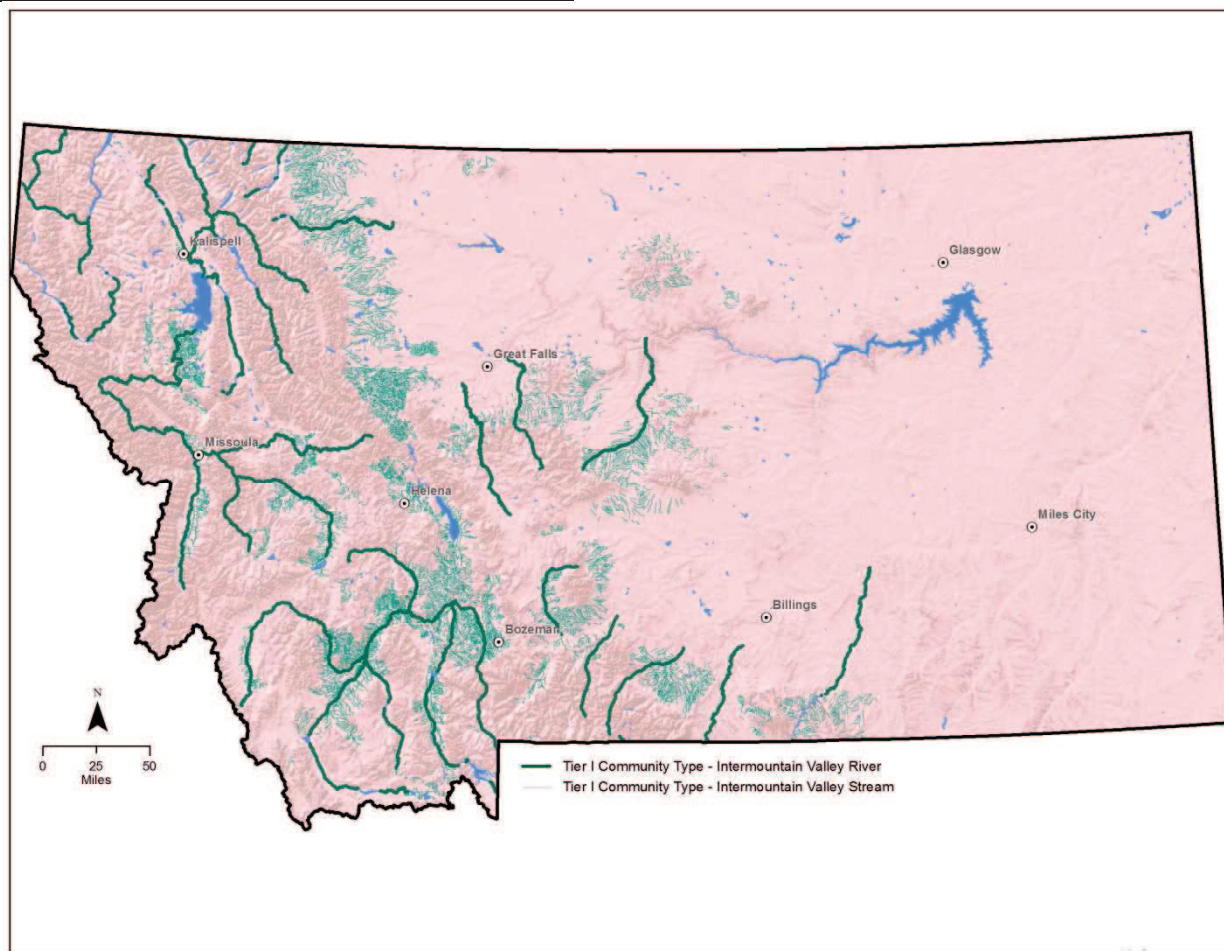


Figure 3. Distribution of Intermountain Valley Rivers and Streams

Intermountain Valley Rivers

1,483 miles

These low to moderate elevation rivers originate in the Canadian Rockies, Middle Rockies, and Northern Rockies Ecoregions, and continue into intermountain valleys or the eastern prairies. The lower reaches of these rivers are confined to open valleys. They have permanent flow, but several are regulated by impoundments (e.g., Madison, Flathead, Kootenai, Big Horn).

The upland areas are typically comprised of coniferous forest, grassland, and cottonwood-willow vegetation communities. Typical fish assemblages include cold water species including threatened bull trout, endangered white sturgeon, Arctic grayling, cutthroat trout, and various dace and sculpin. Sauger are found in the lower reaches of the Judith River.

Disruption of natural water flow, such as diversions, flood control, hydroelectric dams, bank armoring, and irrigation withdrawals, have significantly impacted this community type. Below dams, reaches are impacted by altered water temperatures, introduced fish, unnatural water level fluctuations, and changes in sediment and nutrient transport.

Associated SGCN

Fish

Arctic Grayling
Blue Sucker
Bull Trout
Columbia River Redband Trout
Northern Redbelly Dace
Pygmy Whitefish
Sauger
Spoonhead Sculpin

Sturgeon Chub
Torrent Sculpin
Westslope Cutthroat Trout
White Sturgeon
Yellowstone Cutthroat Trout

Mollusk

Western Pearlshell

Intermountain Valley Streams

5,041 miles

This community type is found in mountainous, moderate-to-high elevation (3,900-8,200 feet), forested, moderately confined-channel streams of the Canadian Rockies, Middle Rockies, and Northern Rockies Ecoregions. The stream sizes are generally small-to-medium (1st-3rd order, average wetted width is 10-16 feet). The average summer temperature is <60°F. While there is permanent flow in these streams, there is strong seasonal variability due to melting snowpack. These streams are the transition from the headwater or forested stream communities to the lower foothills and intermontane rivers. This community type provides important habitat for Montana's native cutthroat trout populations. The substrate is dominated by cobbles and boulders, with gravel in the short pools. The geomorphology is normally a riffle/run/pool configuration. Large woody debris often provides channel material.

Disruption of natural water flow, such as diversions, flood control, hydroelectric dams, bank armoring, and irrigation withdrawals, have negatively impacted this community type the most (Winston et al. 1991). Below dams, reaches are impacted by altered water temperatures, introduced fish, unnatural water level fluctuations, and changes in sediment and nutrient transport.

Associated SGCN

Fish

Arctic Grayling
Bull Trout
Northern Redbelly Dace

Sauger
Westslope Cutthroat Trout
Yellowstone Cutthroat Trout

Intermountain Valley Rivers and Streams Current Impacts, Future Threats, and Conservation Actions

Current Impacts	Future Threats	Conservation Actions
<p>Water management:</p> <p>Agriculture Altered temperature regime Chronic dewatering Interbasin transfers Reservoir management</p>	<p>Water management:</p> <p>Agriculture Altered temperature regime Chronic dewatering Interbasin transfers Reservoir management</p>	<p>Identify dam operations conducive to best quality habitat protection in both reservoirs and rivers</p> <p>Improve and maintain natural stream form and function by ensuring riparian resiliency through land use management and improving instream flows to accurately reflect species needs</p> <p>Investigate/pursue methods to reduce effects of dewatering and entrainment</p> <p>Work with appropriate agencies (i.e., U.S. Army Corps of Engineers (USACE), U.S. Forest Service (USFS), USFWS, Department of Natural Resources and Conservation (DNRC)) to maintain quality aquatic habitats and to mitigate impacts and threats to fisheries resources</p>
<p>Connectivity:</p> <p>Downstream transport: little or no replacement of large woody debris Fish barriers (e.g., culverts, dams, diversions)</p>	<p>Connectivity:</p> <p>Downstream transport: little or no replacement of large woody debris Fish barriers (e.g., culverts, dams, diversions) High hydropower dam potential</p>	<p>Restore connectivity by identifying and removing migration barriers, native fish corridors, and/or by installing fish ladders or other fish passage structures</p> <p>Restore migration routes where tributary mouths have been perched due to lack of flushing flows</p>
<p>Poor grazing practices</p> <p>Poor range management practices</p>	<p>Poor grazing practices</p> <p>Poor range management practices</p>	<p>Support management practices that maintain riparian vegetation and streambank and channel stability in excellent condition</p> <p>Support government and private conservation activities that encourage and support sustainable land management practices</p>

Current Impacts	Future Threats	Conservation Actions
		Work with willing landowners to implement land management practices beneficial to SGCN or overall community type
Riparian management: Impaired habitat and degradation Instream habitat degradation Natural sedimentation Timber harvest	Riparian management: Impaired habitat and degradation Instream habitat degradation Natural sedimentation Timber harvest	Conduct large woody debris projects and channel restoration where needed Potentially provide appropriate incentives to landowners that cooperate in habitat restoration activities to encourage their continued participation Provide technical assistance to local landowners and conservation districts as it pertains to the aquatic habitat, function, and fish assemblage Restore habitat integrity: riparian revegetation when needed Work with private landowners, land management agencies, conservation districts, watershed groups, and other interested parties to conserve and promote healthy riparian habitats beneficial to SGCN and overall community type
Housing development (residential and urban) Railroad Road encroachment on stream corridors	Housing development (residential and urban) Railroad Road encroachment on stream corridors	Provide expertise for prospective stream restoration equipment contractors and help local conservation district with natural resource protection training for real estate contractors
Mining contamination and other impacts	Mining contamination and other impacts	Provide decision makers with data on the impacts and threats to SGCN Work with the USFS and the Department of Environmental Quality in the development of mine clean-up plans and metals reduction (particularly Hg)

Current Impacts	Future Threats	Conservation Actions
Angling pressure	Angling pressure	Continue to make recommendations for harvest regulations
Illegal harvest	Illegal harvest	
Illegal introductions of non-native fish species	Barrier failure	Construction and monitoring of fish passage barriers to reduce non-native species movement
	Expansion of non-native fish species	Eliminate competing fish species by piscicides, trapping, or electrofishing
Non-native species competition, predation, and hybridization	Illegal introductions of non-native fish species	Install fish screens
	Non-native species competition, predation, and hybridization	
Nuisance blooms of <i>Didymosphenia geminata</i>	Nuisance blooms of <i>Didymosphenia geminata</i>	Follow guidance in <i>Montana's Aquatic Nuisance Species (ANS) Management Plan (2002)</i> and updates or revisions to the plan
Extirpated or low populations of SGCN	Extirpated or low populations of SGCN	Conduct research to answer necessary questions for key species (e.g. determine habitat use and spawning location)
		Continue or establish baseline data collection protocol to monitor SGCN relative abundance, distribution, and size structure
		Continue to collect and analyze biological and physical data through the watershed to evaluate success of habitat restoration and improvement
		Continue to collect information that helps us better understand the life histories, habitat requirements, and impacts on SGCN
		Continue to work with landowners and land managers to secure conservation servitudes in areas key to SGCN restoration
		Develop and work toward species restoration goals

Current Impacts	Future Threats	Conservation Actions
		<p>Manage harvest regulations to support low or declining populations</p> <p>Restore degraded habitat in spawning, rearing, and maturation habitats</p> <p>Work with private landowners and land management agencies to identify high value lands adjacent to habitat important for SGCN for hydropower mitigation</p> <p>Work with counties to update and improve floodplain management to protect habitat important to SGCN</p>
	Climate change	<p>Continue to evaluate current climate science models and recommended actions</p> <p>Continue or establish protocols to monitor thermal data, water flow, and conduct insect surveys</p> <p>Monitor habitat changes and address climate impacts through adaptive management as necessary</p>

Additional Citations

Montana Aquatic Nuisance Species Technical Committee. 2002. Montana Aquatic Nuisance Species Management Plan Final. 148 pp.

Winston, M. R., C. M. Taylor, and J. Pigg. 1991. Upstream extirpation of four minnow species due to damming of a prairie stream. Transactions of the American Fisheries Society 120:98–105.

Mixed Systems

916 miles

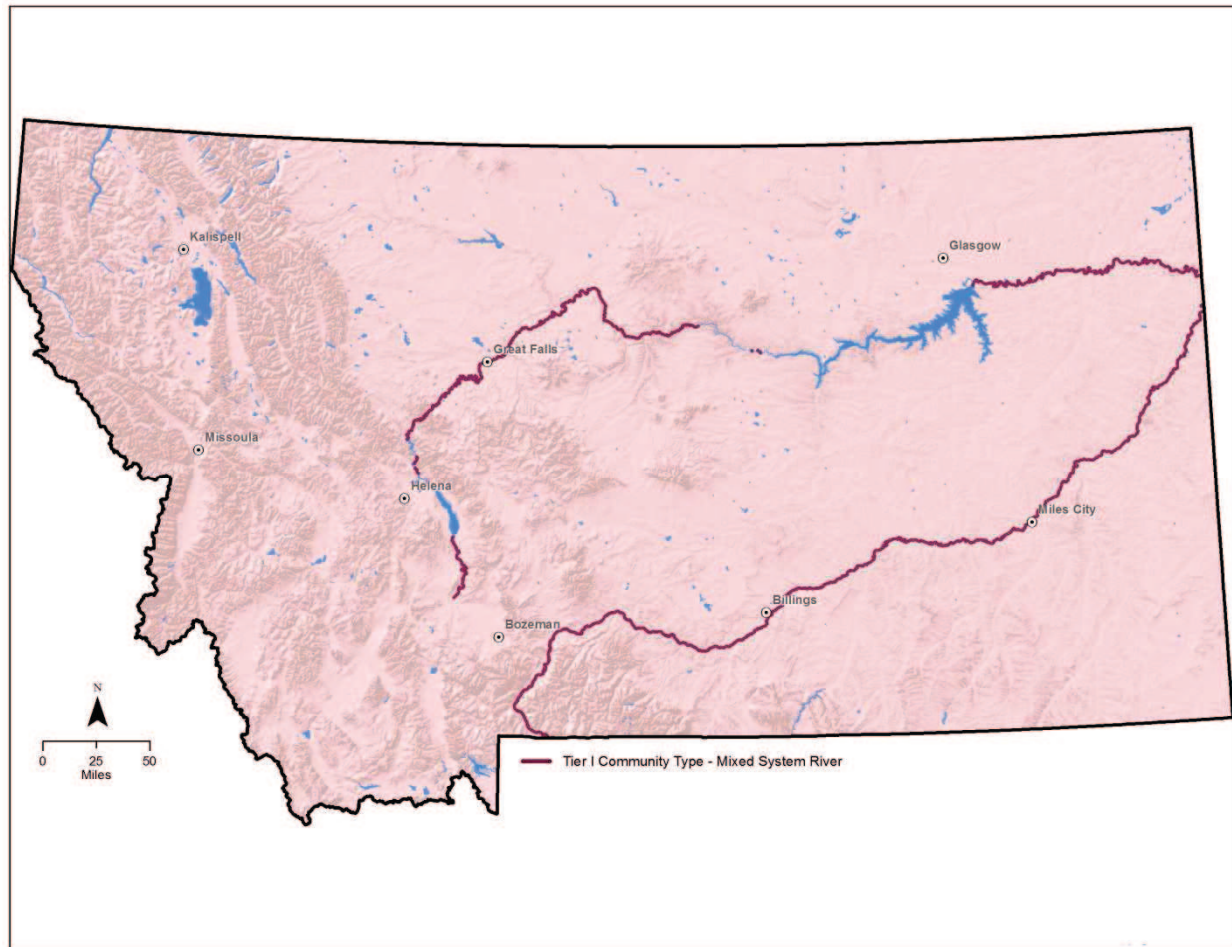


Figure 4. Distribution of Mixed Systems

These systems are characterized by lower gradient runs and riffles with small cobble, gravel, and sands. The upland habitat type is typically cottonwood valley bottoms.

Headwater reaches of this community type transition from cold water trout species to cool and warm water species in middle and lower reaches. This system is considered critical habitat for endangered pallid sturgeon, and a large number of SGCN including sauger, blue sucker, shortnose gar, paddlefish, and sicklefin chub.

Disruption of natural water flow, such as diversions, flood control, hydroelectric dams, bank armoring, and irrigation withdrawals, have significantly impacted this community type. Below dams, reaches are impacted by altered water temperatures, introduced fish, unnatural water level fluctuations, and changes in sediment and nutrient transport. Specifically, the Missouri River is significantly impacted by upper Missouri Reservoir dams and the Fort Peck dam. Likewise, tributary impoundments partially impact the lower Yellowstone, and low-head dams on the Yellowstone mainstem impact the movement of many SGCN.

Associated SGCN

Fish

Blue Sucker

Iowa Darter

Northern Redbelly Dace

Paddlefish

Pallid Sturgeon

Sauger

Shortnose Gar

Sicklefin Chub

Sturgeon Chub

Yellowstone Cutthroat Trout

Mixed Systems Current Impacts, Future Threats, and Conservation Actions

Current Impacts	Future Threats	Conservation Actions
Water management: Altered temperature regime Chronic dewatering Instream flow water rights Water withdrawals	Water management: Altered temperature regime Dewatering Instream flow water rights Water withdrawals	Improve and maintain natural stream form and function by ensuring riparian resiliency through land use management and improving instream flows to accurately reflect species needs Investigate/pursue methods to reduce effects of dewatering and entrainment Work with appropriate agencies (i.e., USACOE, USFS, USFWS, DNRC) to maintain quality aquatic habitats and to mitigate impacts and threats to fisheries resources
Connectivity: Fish barriers (e.g., culverts, dams, diversions)	Connectivity: Fish barriers (e.g., culverts, dams, diversions)	Restore connectivity by identifying and removing migration barriers, native fish corridors, and/or by installing fish ladders or other fish passage structures
Poor grazing practices	Poor grazing practices	Work with landowners to implement land management practices beneficial to SGCN or overall community type
Riparian management	Riparian management: Fuel reduction	Continue to work with willing landowners to develop channel migration easements Potentially provide appropriate incentives to landowners that cooperate in habitat restoration activities to encourage their continued participation Provide technical assistance to local landowners and conservation districts as it pertains to the aquatic habitat, function, and fish assemblage Restore habitat integrity: riparian revegetation when needed

Current Impacts	Future Threats	Conservation Actions
		Work with private landowners, land management agencies, conservation districts, watershed groups, and other interested parties to conserve and promote healthy riparian habitats beneficial to SGCN and overall community type
Mining contamination and other impacts	Mining contamination and other impacts	Provide decision makers with data on impacts and threats to SGCN
Non-native species competition, predation, and hybridization	Barrier loss	Construction and monitoring of fish passage barriers to reduce non-native species movement
	Non-native species competition, predation, and hybridization	Eliminate competing fish species by piscicides, trapping, or electrofishing
Extirpated or low populations of SGCN	Extirpated or low populations of SGCN	<p>Conduct research to answer necessary questions for key species (e.g. determine habitat use and spawning location)</p> <p>Continue or establish baseline data collection protocol to monitor SGCN relative abundance, distribution, and size structure</p> <p>Continue to collect and analyze biological and physical data through the watershed to evaluate success of habitat restoration and improvement</p> <p>Continue to collect information that helps us better understand the life histories, habitat requirements, and impacts on SGCN</p> <p>Develop and work toward species restoration goals</p> <p>Manage harvest regulations to support low or declining populations</p>

Mountain Streams

31,789 miles

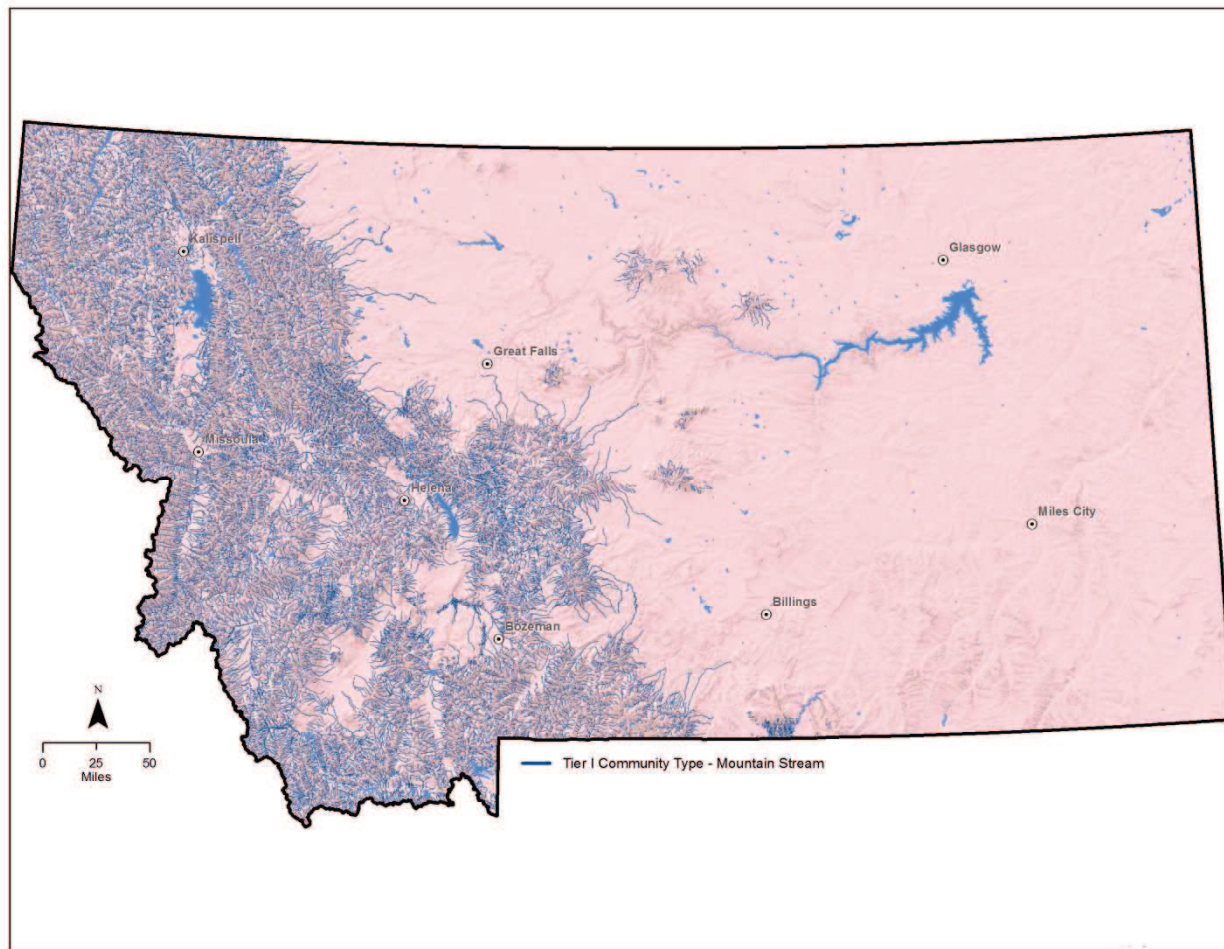


Figure 5. Distribution of Mountain Streams

Mountain streams of western and central Montana are typically cold and clear, and serve as the headwaters for all major river systems in Montana. Mountain streams often flow through montane conifer forests starting at the highest elevations, and can range diversely from high-alpine, steep-gradient reaches to low-gradient, meadow stream types (Stagliano 2005). Abundant native fish species thrive in these waters and are sought after by anglers from around the country.

Many of these native species are declining due to habitat degradation, dams, hybridization, overfishing, and being outcompeted by introduced salmonids. These streams support the remaining genetically pure stocks of Montana's Yellowstone and WCT and bull trout.

Associated SGCN

Fish

Arctic Grayling
Bull Trout
Columbia River Redband Trout
Lake Trout
Northern Redbelly Dace
Northern Redbelly/Finescale Dace

Pygmy Whitefish
Torrent Sculpin
Westslope Cutthroat Trout
Yellowstone Cutthroat Trout

Mollusk

Western Pearlshell

Mountain Streams Current Threats, Future Impacts, and Conservation Actions

Current Threats	Future Impacts	Conservation Actions
<p>Water management:</p> <p>Agriculture Altered temperature regime Chronic dewatering</p> <p>Entrainment in irrigation diversions Interbasin transfers Irrigation withdrawals Reservoir management</p>	<p>Water management :</p> <p>Agriculture Altered temperature regime Chronic and expanded dewatering Deteriorating lake and/or river conditions for migratory fish stocks Entrainment in irrigation diversions Interbasin transfers Irrigation withdrawals Reservoir management</p>	<p>Improve and maintain natural stream form and function by ensuring riparian resiliency through land use management and improving instream flows to accurately reflect species needs</p> <p>Increase instream flows through water leasing and water conservation measures</p> <p>Re-establish flow to intermittent reaches</p> <p>Upgrade and mitigate cumulative impacts of irrigation diversions</p> <p>Work with appropriate agencies (i.e., USACOE, USFS, USFWS, DNRC) to maintain quality aquatic habitats and to mitigate impacts and threats to fisheries resources</p>
<p>Connectivity:</p> <p>Downstream transport: no replacement of large woody debris Fish barriers (e.g., culverts, dams, diversions)</p>	<p>Connectivity:</p> <p>Downstream transport: no replacement of large woody debris Fish barriers (e.g., culverts, dams, diversions)</p>	<p>Enhance and maintain connectivity with lake system</p> <p>Mitigate impacts of irrigation diversions</p> <p>Projects which improve connectivity through restoration of should be priority</p> <p>Restore connectivity by identifying and removing migration barriers, native fish corridors, and/or by installing fish ladders or other fish passage structures</p>
<p>Poor grazing practices</p> <p>Poor range management practices</p>	<p>Poor grazing practices</p> <p>Poor range management practices</p>	<p>Support management practices that maintain riparian vegetation and streambank and channel stability in excellent condition</p> <p>Support government and private conservation activities that encourage and support sustainable land management practices</p>

Current Threats	Future Impacts	Conservation Actions
		Work with landowners to implement land management practices beneficial to SGCN or overall community type
Riparian management: Channelization Fire recovery Impaired habitat/riparian degradation Landslides Natural sedimentation Stream and riparian encroachment Timber harvest	Riparian management: Channelization Fire recovery Fuel reduction Impaired habitat/expanded riparian degradation Landslides Natural sedimentation Stream and riparian encroachment Timber harvest	Conduct large woody debris projects and channel restoration where needed Potentially provide appropriate incentives to landowners that cooperate in habitat restoration activities to encourage their continued participation Provide technical assistance to local landowners and conservation districts as it pertains to the aquatic habitat, function, and fish assemblage Restore habitat integrity: riparian revegetation when needed
Housing development (residential and urban) Railroad Roads	Housing development (residential and urban) Railroad Roads	Mitigate cumulative impacts of road system
Mining contamination and other impacts	Mining contamination and other impacts	Provide decision makers with data on the impacts and threats to SGCN Work with the USFS and the Department of Environmental Quality in the development of mine clean-up plans and metals reduction (particularly Hg)
Angling pressure	Angling pressure	Continue to make recommendations for harvest regulations
Illegal harvest	Illegal harvest	

Current Threats	Future Impacts	Conservation Actions
Expansion of non-native fish	Barrier failure and loss	Barrier reinforcement or replacement
Illegal introductions of non-native fish	Expansion and invasion of non-native fish	Construction and monitoring of fish passage barriers to reduce non-native species movement
Non-native fish species competition, hybridization, and predation	Illegal introductions of non-native fish	Eliminate competing fish species by piscicides, trapping, or electrofishing
	Non-native fish species competition, hybridization, and predation	Manage harvest regulations for the benefit of SGCN
		Protection of native species through habitat protection and enhancement and restoring or introducing SGCN into suitable waters
Nuisance blooms of <i>Didymosphenia geminata</i>	Nuisance blooms of <i>Didymosphenia geminata</i>	Follow guidance in <i>Montana's Aquatic Nuisance Species (ANS) Management Plan</i> (FWP 2002) and updates or revisions to the plan
Extirpated or low populations of SGCN	Extirpated or low populations of SGCN	Conduct research to answer necessary questions for key species (e.g. determine habitat use and spawning location)
		Construct barriers as needed; isolate conservation populations with passage barriers
		Continue or establish baseline data collection protocol to monitor SGCN relative abundance, distribution, and size structure
		Continue to collect and analyze biological and physical data through the watershed to evaluate success of habitat restoration and improvement
		Continue to collect information that helps us better understand the life histories, habitat requirements, and impacts on SGCN
		Continue to work with landowners and land managers to secure conservation servitudes in areas key to SGCN restoration

Current Threats	Future Impacts	Conservation Actions
		<p>Develop and work toward species restoration goals</p> <p>Develop conservation populations in currently fishless headwater reaches</p> <p>Identify and remove migration barriers in critical SGCN corridors</p> <p>Manage harvest regulations to support low or declining populations</p> <p>Restore degraded habitat in spawning, rearing, and maturation habitats</p> <p>Work with private landowners and land management agencies to identify high value lands adjacent to habitat important for SGCN for hydropower mitigation</p> <p>Work with counties to update and improve floodplain management to protect habitat important to SGCN</p>
	Climate change	<p>Continue to evaluate current climate science models and recommended actions</p> <p>Continue or establish protocols to monitor thermal data, water flow, and conduct insect surveys</p> <p>Monitor habitat changes and address climate impacts through adaptive management as necessary</p> <p>Restore riparian corridors and proper width:depth ratios</p>

Additional Citations

Montana Aquatic Nuisance Species Technical Committee. 2002. Montana Aquatic Nuisance Species Management Plan Final. 148 pp.

Stagliano, D. M. 2005. Aquatic Community Classification and Ecosystem Diversity in Montana's Missouri River Watershed. Report to the Bureau of Land Management. Montana Natural Heritage Program, Helena, Montana. 65 pp. plus appendices.

Prairie Rivers and Prairie Streams

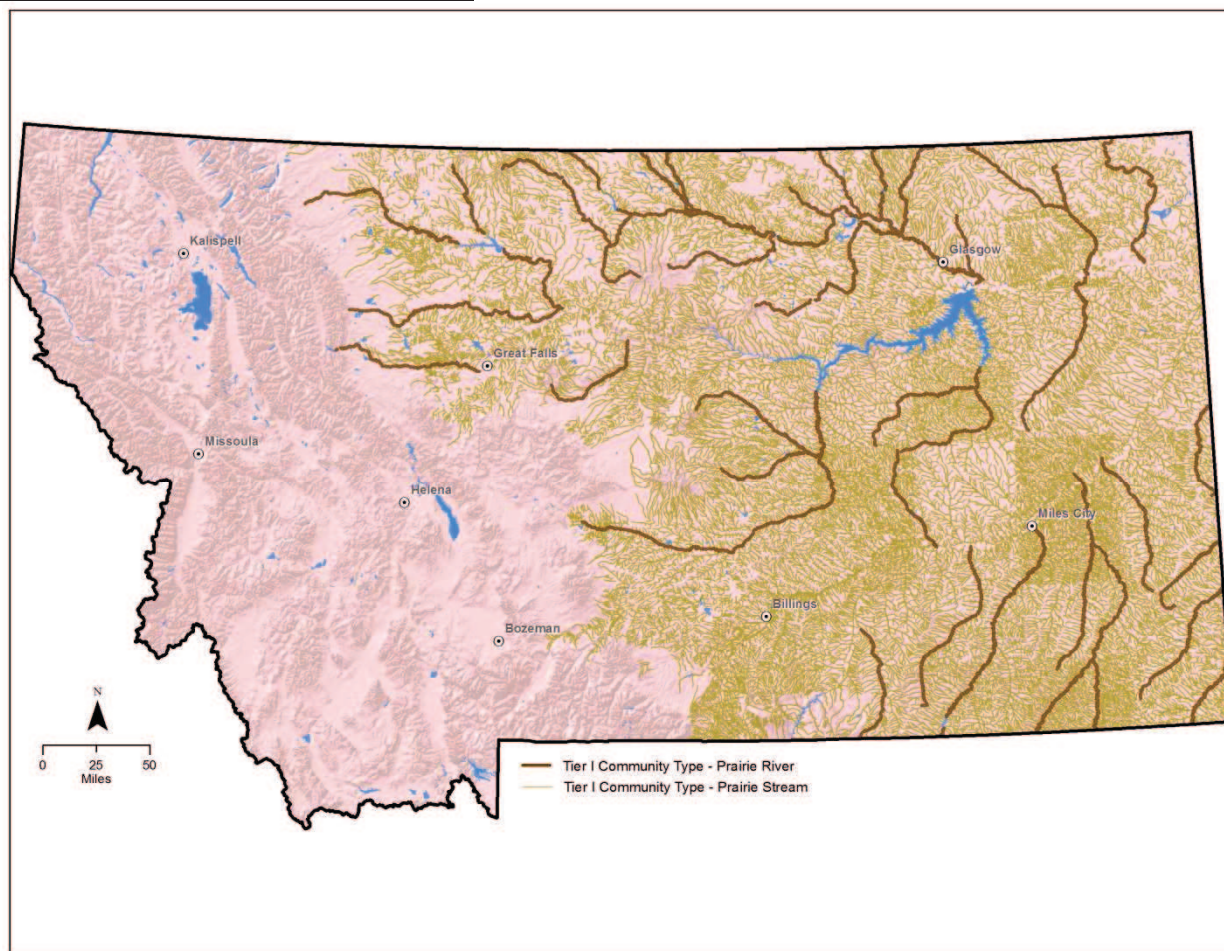


Figure 6. Distribution of Prairie Rivers and Prairie Streams

Prairie Rivers

3,382 miles

This low elevation (below 3,900 feet) community type is comprised of large (4th and 5th order and larger; >100 river miles long; 50-115 feet average wetted width) warm water rivers that have low to moderate gradients. The characteristics of this community type are long, deep runs; pools (2-7 feet deep); and interspaced riffles. The substrate is typically comprised of cobble riffles (when present) to sand and gravel dominated runs and pools. Important fish habitat is found in the lower reaches of the rivers where large woody debris, deep pools, and undercut banks are found. These lower sections of the rivers also provide many miles of spawning and nursery habitat for warm water fishes during the spring and early summer.

Disruption of natural water flow, such as diversions, flood control, hydroelectric dams, bank armoring, and irrigation withdrawals, have negatively impacted this community type the most (Winston et al. 1991). Barriers to necessary long distance spawning created by diversion dams and submerged spawning habitat by reservoirs have negatively impacted reproduction. Below dams, reaches are impacted by altered water temperatures, introduced fish, unnatural water level fluctuations, and changes in sediment and nutrient transport.

Associated SGCN

Fish

Blue Sucker
Iowa Darter
Northern Redbelly Dace
Northern Redbelly/Finescale Dace
Paddlefish

Pallid Sturgeon
Pearl Dace
Sauger
Shortnose Gar
Sicklefin Chub
Sturgeon Chub

Prairie Streams

29,264 miles

Prairie Streams in Montana have water either intermittently or permanently flowing through them in an otherwise dry region. These low-elevation streams east of the Rocky Mountains are warmer than their counterparts in western Montana and support a richer and quite different variety of fish. Many of these streams are slow moving and sometimes turbid and weedy, while those in the northern glaciated plains can be as clear as a mountain stream. They offer good rearing habitat for associated fish species, support many amphibians and reptiles, and are crucial for populations of terrestrial wildlife (Stagliano 2005).

The interruption of water flow, such as with small dams, water diversions, and stock ponds has negatively impacted Prairie Streams (Winston et al. 1991).

Associated SGCN

Fish

Iowa Darter
Northern Redbelly Dace
Northern Redbelly/Finescale Dace

Pearl Dace
Sauger
Sturgeon Chub

Prairie Rivers and Prairie Streams Current Threats, Future Impacts, and Conservation Actions

Current Threats	Future Impacts	Conservation Actions
<p>Water management:</p> <p>Agriculture Altered temperature regime Chronic dewatering Entrainment of fish in irrigation diversions Instream flow water rights Interbasin transfers Irrigation withdrawals Off stream reservoirs Reservoir management Stream diversions Water diversions Water withdrawals</p>	<p>Water management:</p> <p>Agriculture Altered temperature regime Chronic dewatering Entrainment of fish in irrigation diversions Instream flow water rights Interbasin transfers Irrigation withdrawals Off stream reservoirs Reservoir management Stream diversions Water diversions Water withdrawals</p>	<p>Improve and maintain natural stream form and function by ensuring riparian resiliency through land use management and improving instream flows to accurately reflect species needs</p> <p>Increased installation of stockwater wells in place of irrigation ditches</p> <p>Investigate/pursue methods to reduce effects of dewatering and entrainment</p> <p>Screening or modification of irrigation diversions or other water intakes in a manner that prevents entrainment of fishes</p> <p>Work with appropriate agencies (i.e., USACOE, USFS, USFWS, DNRC) to maintain quality aquatic habitats and to mitigate impacts and threats to fisheries resources</p>
<p>Connectivity:</p> <p>Fish barriers (e.g., culverts, dams, diversions); these barriers may have a higher impact in low water years</p>	<p>Connectivity:</p> <p>Fish barriers (e.g., culverts, dams, diversions); these barriers may have a higher impact in low water years</p>	<p>Continue to collect data on SGCN that give better insight on how fish passage at dams will affect the aquatic community</p> <p>Projects which improve connectivity should be priority</p> <p>Restore connectivity by identifying and removing migration barriers, native fish corridors, and/or by installing fish ladders or other fish passage structures</p>
<p>Poor grazing practices</p> <p>Poor range management practices</p>	<p>Poor grazing practices</p> <p>Poor range management practices</p>	<p>Support management practices that maintain riparian vegetation and streambank and channel stability in excellent condition</p> <p>Support government and private conservation activities that encourage and support sustainable land management practices</p>

Current Threats	Future Impacts	Conservation Actions
		Work with landowners to implement land management practices beneficial to SGCN or overall community type
Riparian management	Riparian management	<p>Continue to work with willing landowners to develop channel migration easements</p> <p>Implement bioengineered bank stabilization techniques</p> <p>Participate in educational programs to disseminate data and foster advocacy for fisheries resources</p> <p>Potentially provide appropriate incentives to landowners that cooperate in habitat restoration activities to encourage their continued participation</p> <p>Provide technical assistance to local landowners, conservation districts, agencies, and others as it pertains to the aquatic habitat, function, fish assemblage, and impacts and threats to the fisheries resource</p> <p>Restore habitat integrity: riparian revegetation when needed</p> <p>Work with private landowners, land management agencies, conservation districts, watershed groups, and other interested parties to conserve and promote healthy riparian habitats beneficial to SGCN and overall community type</p>
Housing development (residential and urban)	Housing development (residential and urban)	Provide decision makers with data on impacts and threats to fisheries resources
Roads	Roads	
Habitat fragmentation	Habitat fragmentation	Restore habitat integrity (e.g., wetland restoration)
Mining contamination and other impacts	Mining contamination and other impacts	Provide decision makers with data on the impacts and threats to SGCN

Current Threats	Future Impacts	Conservation Actions
Coal development	Coal development	Support research and scientific studies on impacts of energy development on prairie stream environments in both Montana and Wyoming
Oil and gas exploration and extraction	Oil and gas exploration and extraction	
Non-native species competition, predation, and hybridization	Barrier failure Non-native species competition, predation, and hybridization	Construction and monitoring of fish passage barriers to reduce non-native species movement Eliminate competing fish species by piscicides, trapping, or electrofishing Protection of native species through habitat protection and enhancement and restoring or introducing SGCN into suitable waters Stock sterile non-native fish for angler harvest
Extirpated or low populations of SGCN	Extirpated or low populations of SGCN	Conduct research to answer necessary questions for key species (e.g. determine habitat use and spawning location) Continue or establish baseline data collection protocol to monitor SGCN relative abundance, distribution, and size structure Continue to collect information that helps us better understand the life histories, habitat requirements, and impacts on SGCN Develop and work toward species restoration goals Manage harvest regulations to support low or declining populations

Current Threats	Future Impacts	Conservation Actions
	Climate change	<p>Continue to evaluate current climate science models and recommended actions</p> <p>Continue or establish protocols to monitor thermal data, water flow, and conduct insect surveys</p> <p>Monitor habitat changes and address climate impacts through adaptive management as necessary</p>

Additional Citations

Stagliano, D. M. 2005. Aquatic Community Classification and Ecosystem Diversity in Montana's Missouri River Watershed. Report to the Bureau of Land Management. Montana Natural Heritage Program, Helena, Montana. 65 pp. plus appendices.

Winston, M. R., C. M. Taylor, and J. Pigg. 1991. Upstream extirpation of four minnow species due to damming of a prairie stream. Transactions of the American Fisheries Society 120:98–105.

Lakes and Reservoirs

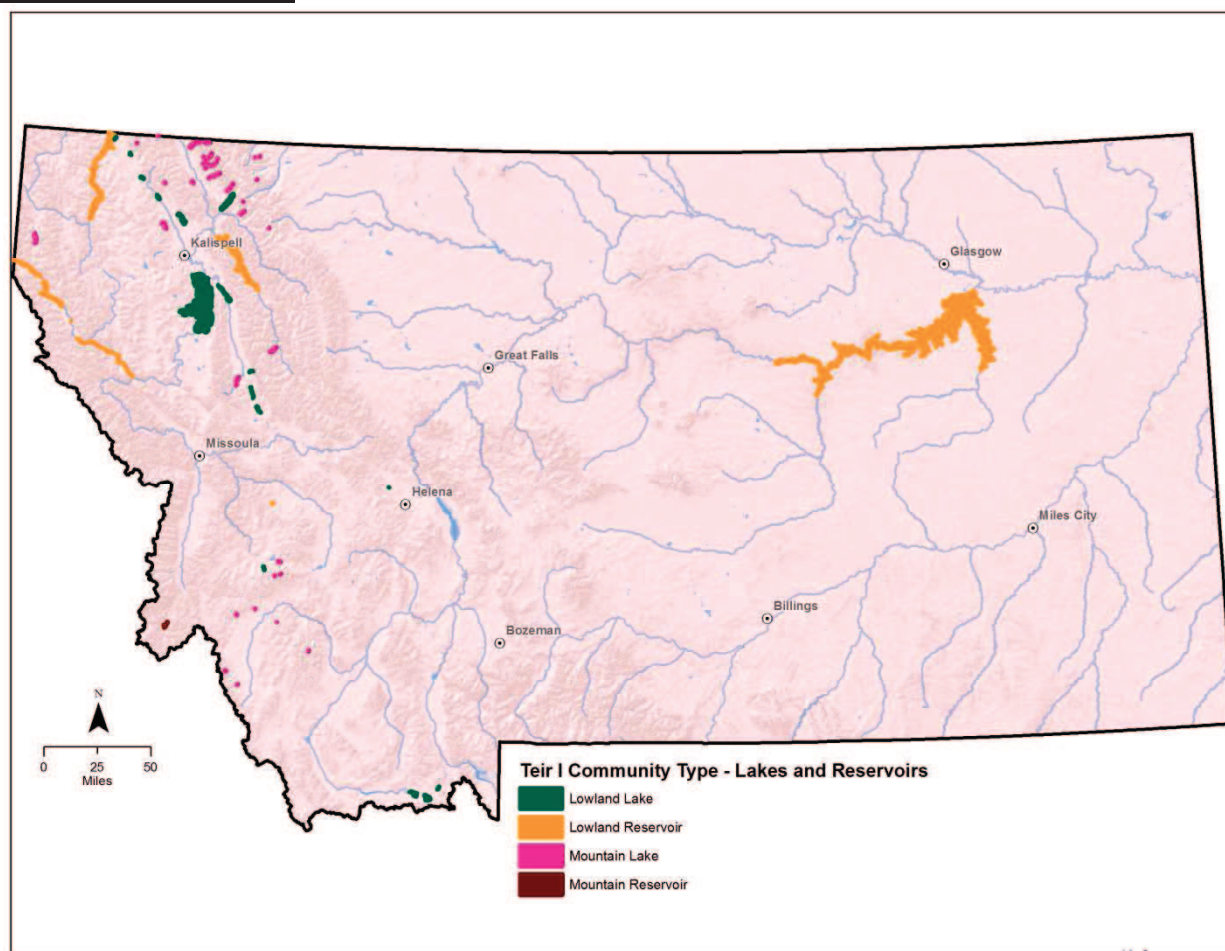


Figure 7. Distribution of Tier I Lakes and Reservoirs

In this SWAP, lakes were categorized as a Tier II community type and reservoirs as a Tier III. However, the technical team acknowledged that some lakes and reservoirs were critical to the persistence of some SGCN, and recommended that specific lakes and reservoirs be elevated to a Tier I community type. The list of these lakes and reservoirs can be found in Appendix F.

Lowland Lakes Associated SGCN

Fish

Arctic Grayling
Blue Sucker
Bull Trout
Lake Trout
Paddlefish

Pallid Sturgeon
Pygmy Whitefish
Sauger
Shortnose Gar
Westslope Cutthroat Trout
Yellowstone Cutthroat Trout

Lowland Reservoirs Associated SGCN

Fish

Arctic Grayling
Bull Trout
Lake Trout
Paddlefish
Pallid Sturgeon

Pygmy Whitefish
Sauger
Trout-perch
Westslope Cutthroat Trout
Yellowstone Cutthroat Trout

Mountain Lakes Associated SGCN

Fish

Arctic Grayling
Bull Trout
Columbia River Redband Trout

Lake Trout
Pygmy Whitefish
Westslope Cutthroat Trout
Yellowstone Cutthroat Trout

Mountain Reservoirs Associated SGCN

Fish

Arctic Grayling
Bull Trout

Columbia River Redband Trout
Westslope Cutthroat Trout
Yellowstone Cutthroat Trout

Lowland Lakes Current Impacts, Future Threats, and Conservation Actions

**17-Tier I Lowland Lakes
3,996,656 acres**

Current Impacts	Future Threats	Conservation Actions
Dewatering	Dewatering	Monitor water quality
	Increased Water withdrawal	Work to reduce water withdrawal
Lake eutrophication	Lake eutrophication	
Fish barriers (e.g., culverts, dams, diversions)	Fish barriers (e.g., culverts, dams, diversions)	Enhance fish passage
Timber harvest	Timber harvest	Continue to review timber sales
Angling pressure	Angling pressure	Continue to make recommendations for harvest regulations
Illegal harvest	Illegal harvest	
	Expansion of non-native fish	Construction and monitoring of fish passage barriers to reduce non-native species movement
Non-native species hybridization	Non-native species hybridization	
Extirpated or low populations of SGCN	Extirpated or low populations of SGCN	Continue gill net trend monitoring
		Continue to monitor fish population trends
		Develop and work toward species restoration goals
	Climate change	Continue to evaluate current climate science models and recommended actions
		Continue or establish protocols to monitor thermal data and water quality
		Monitor habitat changes and address climate impacts through adaptive management as necessary

Lowland Reservoirs Current Impacts, Future Threats, and Conservation Actions

**7-Tier I Lowland Reservoirs
123,484 acres**

Current Impacts	Future Threats	Conservation Actions
Water management: Irrigation withdrawals	Water management: Irrigation withdrawals	Develop a reservoir/river model to better facilitate spawning and rearing habitat needed for optimal growth and survival For Fort Peck Reservoir, follow guidance in the <i>Fort Peck Reservoir Fisheries Management Plan 2012-2022</i> (FWP 2012b) Work with appropriate agencies (i.e., USACOE, USFS, USFWS, DNRC) to maintain quality aquatic habitats and to mitigate impacts and threats to fisheries resources
Fish barriers (e.g., culverts, dams, diversions)	Fish barriers (e.g., culverts, dams, diversions)	Enhance fish passage
Non-native species predation, competition, and hybridization	Non-native species predation, competition, and hybridization	Construction and monitoring of fish passage barriers to reduce non-native species movement
Extirpated or low populations of SGCN	Extirpated or low populations of SGCN	Continue to collect baseline data and look for additional opportunities to better understand recruitment of certain SGCN Continue to restore degraded habitat in spawning, rearing, and maturation habitats Continue to work with landowners and land managers to secure conservation servitudes in areas key to SGCN restoration Develop a reservoir/river model to better facilitate spawning and rearing habitat needed for optimal growth and survival Work with USFS to provide best quality multiple use prescriptions for important habitat around the reservoirs

Mountain Lakes Current Impacts, Future Threats, and Conservation Actions

**37-Tier I Mountain Lakes
11,077 acres**

Current Impacts	Future Threats	Conservation Actions
Dewatering	Dewatering	Protect water quality
Connectivity: Fish barriers (e.g., culverts, dams, diversions)	Connectivity: Fish barriers (e.g., culverts, dams, diversions)	Enhance fish passage
Timber harvest	Timber harvest	Continue to review timber sales
Development Railroad Roads	Development Railroad Roads	Work with local governments and other entities to update and improve the Lake Shore Protection Act
Mining contamination and other impacts	Mining contamination and other impacts	Provide decision makers with data on the impacts and threats to SGCN
Angling pressure	Angling pressure	Continue to make recommendations for harvest regulations
Non-native species predation, competition, and hybridization	Non-native species predation, competition, and hybridization	Continue to monitor native and preferred recreational species and illegally introduced species
Extirpated or low populations of SGCN - isolation makes recruitment highly vulnerable	Extirpated or low populations of SGCN - isolation makes recruitment highly vulnerable	Identify potential creation of important spawning and rearing habitat for SGCN Work with private landowners and land management agencies to identify high value lands adjacent to habitat important for SGCN for hydropower mitigation

Current Impacts	Future Threats	Conservation Actions
	Climate change	Continue to evaluate current climate science models and recommended actions Continue or establish protocols to monitor thermal data and water quality Monitor habitat changes and address climate impacts through adaptive management as necessary

Mountain Reservoirs Current Impacts, Future Threats, and Conservation Actions

**2-Tier I Mountain Reservoir
565 acres**

Current Impacts	Future Threats	Conservation Actions
	Improvements to the reservoir or East Fork Rock Creek could impact the entire bull trout population	Improved reservoir management Re-establish flow to intermittent reach
		Review all proposed actions in the drainage to ensure that negative impacts to aquatic habitat are minimized.
		Continue to work with USFS, USFWS, and DNRC on completing East Fork Dam consultation for renewal of the special use permit. Potential improvements that may be achieved through this process include improvement in minimum reservoir elevations and improved flow in intermittent reach above reservoir.
		Participate in land use planning efforts for this drainage when they occur to maximize habitat protection.
		Continue electrofishing surveys to monitor the status of bull trout and to determine whether mitigation measures implemented lead to improvements in this population.